In Memoriam: Daniel Chemla (1940-2008)

Daniel Chemla, a physicist recognized as one of the world's foremost authorities on the optical and electronic properties of materials, a leading advocate for nanoscale science, and the man credited with making the Advanced Light Source at the Lawrence Berkeley National Laboratory (Berkeley Lab) one of the nation’s premier scientific user facilities, has died. He was 67.

“Daniel Chemla was a visionary in the materials sciences, nanoscience and synchrotron source science and I am in awe of his record and grateful for his legacy," said Berkeley Lab Director Steven Chu. “Even at Bell Labs, where our paths first crossed, Daniel was always positively visionary about what could be done and then proceeded to make it happen."

Chemla passed away in his Kensington home on Thursday morning, March 20, 2008. Four years ago, he suffered from a stroke and had been battling a series of health problems since. At the time of his death, he was surrounded by family and friends, including his wife Berit.

A French national who was born in Tunisia, Chemla earned his undergraduate degree at l'Ecole Nationale Supérieure des Télécommunications in Paris, and did his graduate work at the University of Paris. Although he began his studies as an elementary particle physicist, he switched to optics, specifically the interaction of laser radiation with matter. His primary interest was on "quantum size effects" in ultra-small material structures, i.e., solids so small their physical properties become size-dependent. He received his Ph.D. in non-linear optics from the University of Paris in 1972.

Following nine years with the Centre National d'Etudes des Télécommunications, where he rose to the position of department head, Chemla came the United States in 1981 to work at the renowned AT&T Bell Laboratories in Holmdel, NJ. There he pursued research on optoelectronics in semiconductor quantum wells and superlattices. In 1983, he became the Head of the Quantum Physics and Electronic Research Department. Eight years later, in 1991, he was recruited to Berkeley Lab by then director and former Bell Labs colleague, Charles Shank, to become the first director

of a newly formed Materials Sciences Division. He also received at that time a faculty position in the Physics Department of the University of California at Berkeley.

In 1998, Shank asked Chemla to assume additional duties as director of Berkeley Lab’s Advanced Light Source (ALS), an electron synchrotron designed to produce some of the world’s brightest beams of ultraviolet and x-ray light for scientific and technological research. From its opening in 1993, the facility had experienced budget crunches, delays in the construction of new beamlines, and organizational difficulties that had raised into question whether the U.S. Department of Energy (DOE), the supporting agency, would allow it to continue. Under Chemla’s leadership, the ALS was transformed into a thriving success story that continues today.

"Daniel Chemla single-handedly re-energized the ALS during its most difficult hour using his remarkable leadership talent and scientific vision," said Patricia Dehmer, Deputy Director for Science Programs with DOE's Office of Science, which oversees the ALS. "That he could do so with no previous background in synchrotron facilities is amazing."

It was during his tenure as director of both the ALS and the Materials Sciences Division that Chemla also saw his vision of “changing the paradigm for nanoscale materials research” become a reality when, thanks in great part to his personal efforts which began when he came to Berkeley, DOE selected Berkeley Lab to host the first of five Nanoscale Science Research Centers and the only one on the West Coast. This center, which Chemla named “The Molecular Foundry,” was officially dedicated on March 24, 2006, and it bears a plaque with his name and likeness at the entrance to the “Chemla Seminar Room."

Chemla stepped down as director of the Materials Sciences Division in 2003 to concentrate on the ALS, but in the aftermath of a stroke in 2004 and subsequent health problems, he retired as ALS director in 2005. His six year tenure at the helm of the ALS saw a tripling in both the number of beamlines and the number of scientific users at the facility. Despite his health problems, he had continued to lead a productive research group until very recently.

Chemla’s talents were not limited to science. At the age of 15, he began the study of judo and eventually won the rank

of godan, or fifth degree black belt in karate, the highest rank awarded in Shotokan Karate of America. As an early pupil of Tsutomu Ohshima, he founded France Shotokan, was its first Black Belt Council chairman, and designed the instructor's qualification program for the French government. He translated Master Gichin Funakoshi's “Karate-do Kyohan,” the widely accepted karate master text, into French. He was also instrumental in starting karate training in Switzerland, Israel and throughout Europe. He leaves a legacy of 50 years of martial arts study with pupils in the US, Canada and Europe. In a 1997 interview, he said he “never felt there was a difference between science and martial arts, especially physical sciences.”

Chemla was elected a Member of the National Academy of Sciences and a Fellow of the American Physical Society. He was also a member of the Optical Society of America, and the Institute of Electrical and Electronic Engineers. In 1988, he received the R.W. Wood prize of the Optical Society of America, and in 1995 the Quantum Electronics Award of the IEEE Laser and Electro-Optics Society, and a Humboldt Research Award. In 2005, on the occasion of his 65th birthday, he was awarded an honorary doctorate by the Ecole Normale Supérieure (ENS) in Cachan, France. Also in that same year, a special issue of the journal *Chemical Physics* was published with the title*:* "Molecular Nanoscience — In honour of Daniel S. Chemla on his 65th birthday".

Chemla is survived by his wife Berit, two children, Yann, an assistant professor of physics at the University of Illinois, Urbana-Champaign, and Britt Chemla Jones, an Art History lecturer in Houston, Texas. The family is planning a memorial to honor him in the near future.